

# Nan Wang

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## ACADEMIC EXPERIENCE

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University of California, Santa Cruz, Santa Cruz CA Sep 2018—2023 (Expected)

Ph.D. in Computer Sci. and Eng., **GPA:** 3.85/4.0, **Emphasis:** motion planning, hybrid systems, MPC.

Tongji University, Shanghai China

Sep 2015—Jun 2018

M.E. in Control Sci. and Eng., **GPA:** 4.33/5.0, **Emphasis:** trajectory planning, autonomous vehicles.

East China Univ. of Sci. and Tech., Shanghai China

Sep 2011—Jun 2015

B.E. in Automation, **GPA:** 3.50/4.0, **Emphasis:** path planning, tracking control.

## SELECTED PROJECTS AND RESEARCH

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Hybrid Systems Lab (UCSC, PI: Ricardo Sanfelice)

Graduate Student Researcher

- MPC-based Tracking Control for Hybrid Systems Mar 2022 - Present
  - Designed a **model predictive controller** for hybrid systems to track motion plans with proven **asymptotic stability** property.
- Robotics Applications Projects Sep 2021 - Present
  - Implemented a tracking controller for **self-driving vehicles** with **global invariance** property.
  - Implemented a set-based planner for **drones** considering obstacles exhibiting **hybrid dynamics**.
- RRT Motion Planning Algorithm for Hybrid Systems Sep 2021 - Mar 2022
  - Designed an **RRT-based** motion planning algorithm for hybrid systems, called HyRRT, with the proven **probabilistic completeness** property. Implemented a HyRRT software tool that improves the computation performance by **95.5%**.
- Feasible Motion Planning for Hybrid Systems Sep 2018 - Mar 2021
  - Mathematically defined the motion planning problem, systematically formalized the **propagation**, **reversal**, and **concatenation** operations for hybrid systems, and designed a motion planning algorithm template for hybrid systems with proved **completeness** properties.

Lab of Vehicle Control & Networking (Tongji, PI: Jun Wang)

Research Assistant

- Autonomous Vehicle Development Jan 2018 - Aug 2018
  - Led a team of three to develop the Decision Making, Planning, and Control Module on a **full-size autonomous vehicle platform**.
  - Developed a **finite state machine**-based decision making module using **Stateflow**.
- Flow Field-guided Trajectory Planning for Ground Vehicles Mar 2017 - Jul 2018
  - Developed a novel trajectory planning algorithm for the unmanned ground vehicles which navigates the vehicle using the **fluid field** information.
- Path Planning for Autonomous Parking Systems Jul 2015 - Dec 2015
  - Developed a **geometric** path planning method for autonomous parking systems that decreases the **minimal length** of the feasible parking lot by **7%**.

## ADDITIONAL INFORMATION

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**Skills:** MATLAB/Simulink, Python, C/C++, C#, CarMaker, CarSim, ROS, Git, HTML/CSS, L<sup>A</sup>T<sub>E</sub>X

**Publications:** IAVSD 2017, CDC 2017 and 2022, CCTA 2022, Dynamics of Vehicles on Roads & Tracks.

**Teaching Assistantship:** Analysis of Algorithm, Database Systems, Robot Automation, Computer Systems and C Programming.

**Award:** Chancellor's Fellowship. **Academic Service:** Technical committee member in IEEE CSS Technical Committee on Hybrid Systems